

REMARKS

In response to the above Office Action, the claims have been amended to avoid improper multiple dependency and claim 1 to place it in more traditional U.S. format by including the transitional phrase "comprising."

In the Office Action the Examiner rejected claims 1-5 under 35 U.S.C. §102(b) for being anticipated by or, in the alternative, under 35 U.S.C. §103(a) for being obvious over Masanobu et al. [sic Sato et al] (JP-10298854-A) hereafter JP'854 or U.S. Patent No. 5,887,280 to Waring. Attached for the Examiner's consideration is a complete English translation of JP'854.

The fabric for clothes of the present invention has a compression ratio of a micro-area in the fabric surface on the surface side opposite to a wearer's body of from 8 to 90%, and has streaky protruded portions on the surface side opposite to the body (claim 1). For example, when swimwear is made of the fabric having the streaky protruded portions arranged on the surface side opposite to the body, resistance of the swimwear to a fluid such as water can be remarkably decreased.

On the other hand, JP'854 discloses a knitted fabric for swimming suits having specific uneven portions (concave-convex portions) on the back surface side. That is, the specific uneven portions are arranged on the skin side surface of the fabric in the swimming suit. This is disclosed in paragraph [0020], line 4 of the English translation of JP'854. The swimming suit has the effect of water omission and cold feeling mitigation, as disclosed in paragraph [0010].

There is no disclosure or suggestion in JP'854 of a fabric having the specific uneven portions on the surface side opposite to a wearer's body as well as the specific compression ratio of micro-area in the fabric surface as defined in the present invention.

Accordingly, it is submitted that neither claim 1 nor claims 2-12 dependent therefrom can be considered to be anticipated by or even obvious over JP'854, since M.P.E.P. §2143 requires the prior art to teach or suggest all of the claimed limitations to establish a prima facie case of obviousness.

Waring discloses a wearable article having a drag reduction arrangement such as vortex generators to decrease resistance of a fluid. Specifically, the vortex generators consist of small flexible plastic pieces sewn or molded in rows on specific portions of the article.

On the other hand, the fabric of the present invention has a compression ratio of a micro-area of from 8 to 90% and has streaky protruded portions.

In the present invention, a method for making the compression ratio of a micro-area in the fabric surface falling in a range of from 8 to 90% includes a method of forming the fabric surface out of a soft, elastic fiber, a method of covering the fabric surface with a soft elastic resin, and a method of making the fabric surface have a special, compressible shape (see page 6, lines 16 to 22 of the present specification). Moreover, a fabric of the present invention is imparted with streaky protruded portions in order to form a compressible shape.

In Waring, a hard material appears to be used as the vortex generators in order to disturb a fluid, though there is no disclosure in Waring regarding a hardness of the material. Moreover, the article appears to be imparted with dotted portions rather than streaky portions in order to disturb the fluid.

In any event, there is no disclosure or suggestion in Waring regarding a compression ratio of micro-area in the fabric surface and streaky protruded portions as defined in the present invention.

Accordingly, it is submitted that neither claim 1 nor claims 2-12 dependent therefrom can be considered to be anticipated by or obvious over Waring either.

Claims 1-5 were also rejected under 35 U.S.C. §102(e) for being anticipated by or, in the alternative, under 35 U.S.C. §103(a) for being obvious over U.S. 2002/0152531 to Fusco et al., hereafter Fusco.

Fusco discloses a swimsuit having a protuberance with a predetermined width and length in a lengthwise direction of a hand or leg on a portion covering the hand or leg. The protuberance is to optimize a swimmer's movement, and not to decrease resistance to fluid.

In Fusco, the protuberance is arranged on a very small portion of the swimsuit's surface. Accordingly, it is believed that Fusco does not have an adequate compression ratio of micro-area in the fabric surface as in the present invention.

In any event, there is no disclosure or suggestion in Fusco regarding streaky protruded portions as defined in the present invention.

Accordingly, it is submitted that neither claim 1 nor claims 2-12 dependent therefrom are anticipated by or obvious over Fusco.

It is believed claims 1-12 are in condition for allowance and such action is, therefore, requested.

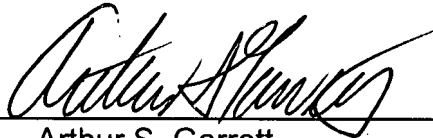
In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: September 19, 2007

By: 
Arthur S. Garrett
Reg. No. 20,338
Tel: 202-408-4091

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(21)Application number : 09- (71)Applicant : TORAY IND INC
106191

(22)Date of filing : 23.04.1997 (72)Inventor : SATO MASANOBU
NIWA UJITERU
YANO HIROYUKI

(54) KNITTED FABRIC FOR SWIMMING SUIT AND SWIMMING SUIT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide at a low cost a knitted fabric used for swimming suits, reducing the cold touch of a body to decrease the uncomfortable feeling of the wearer, after the wearer steps out of a pool, and satisfying fabric stretchability required for the swimming suits and further the aesthetic property of the fabric, and to provide a swimming suit using the knitted fabric at a low cost.

SOLUTION: This knitted fabric for swimming suits consists mainly of synthetic multi-filaments, and has the following characteristics. The back surface knitted portion of the knitted fabric has uneven portions having a height difference of 0.2-2.0 mm, and the maximum height value of the projections is 0.6-2.2 mm. The projections occupy $\geq 35\%$ of the whole area of the back surface. The water-retaining capacity of the knitted fabric back surface is $\leq 30\%$ in a wet state. The swimming suit comprises the knitted fabric for the swimming suits.

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CLAIMS

[Claim(s)]

[Claim 1] Water wear knitting fabric which is the knitting fabric which makes synthetic-fiber multifilament a subject, has the concave heights in which the section edited by the rear face has the difference of elevation 0.2mm or more 2.0mm or less, and these heights occupy 35% or more, and gets wet in the whole rear-face surface product ratio while the maximum of the width of face of these heights is 0.6mm or more 2.2mm or less, and is characterized by the water retention value on the rear face of knitting fabric at the time being 30% or less.

[Claim 2] Water wear knitting fabric according to claim 1 this whose knitting fabric is intersection knitting of this synthetic-fiber multifilament yarn and this polyurethane elastic yarn.

[Claim 3] The swimming suit characterized by becoming either of claims 1 and 2 from the water wear knitting fabric of a publication.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the swimming suit excellent in the body cold sense mitigation nature after going up from underwater [which consists of water wear knitting fabric and it excellent in the cold sense mitigation nature at the time of wear].

[0002]

[Description of the Prior Art] Since the ease of moving when swimming is required, sewing of the swimming suit is carried out so that the good knitting fabric of elongation may be used and the body may be fitted. For this reason, in order for the swimming suit itself to absorb a lot of moisture, the displeasure accompanying the cold of the body is sensed, at the same time water piles up between the body and a swimming suit after going up from a pool etc. This inclination is especially remarkable in seasons other than midsummer.

[0003] The ground which performed water repellent finishing to JP,55-26243,A all over knitting containing polyurethane elastic yarn or textiles as an attempt which mitigates the displeasure accompanying the cold of the body is proposed. This has the effectiveness which mitigates the displeasure accompanying the cold at the time of wear, in order for polyurethane elastic yarn not to deteriorate with the chlorine contained to a pool and for the swimming suit itself to seldom absorb water.

[0004] however, the case where wore the swimming suit using this ground and it swims -- the ground -- since water repellent finishing has been carried out to the whole surface, the water which permeated between the body and a swimming suit will pass through the ground, it

will be hard to escape outside from it, and water will pile up between the body and a swimming suit. Consequently, it has the fundamental fault of increasing a feeling of fatigue it being hard to swim.

[0005] On the other hand, in JP,3-51312,A and JP,3-14178,U, the fiber containing a solar light absorption agent etc., or they or the becoming textile is proposed. However, these absorb the visible ray and near infrared ray of sunlight, change them into heat, do not obtain heat retaining property, and have the fault of being ineffective in the place which sunlight does not reach like a cloudy day or an indoor pool.

[0006] Moreover, at JP,6-79786,U, it is 40 - 90% to one side of knitting fabric. The knitting fabric which gave the water-repellent print partially by surface ratio is proposed. However, although the swimming suit using this knitting fabric had the effectiveness which mitigates the displeasure accompanying the cold of the body, without barring water omission nature, it had the problem that the costs which water-repellent print processing takes were high, and led to a cost rise.

[0007] Furthermore, in JP,9-41244,A, the water wear knitting fabric which has the concavo-convex structure which used the mini pile organization and the pile organization is proposed. This was what [only] aimed at getting wet by making a skin side a pile organization, and raising the heat retaining property at the time.

[0008] However, since a contact with the skin increases since a mini pile and the usual pile organization have too narrow spacing of the adjoining pile loop-formation comrade, and a pile side contains water well from the loop shape, the water retention value by the side of the skin becomes high. Therefore, it gets wet and quick-drying has further the increase of a feeling of the smeariness at the time of wear, and the fundamental fault of being very inferior. In addition, it originates in ***** of wear endurance, such as MOMOKE generating of a pile side, or pile structure, and there is also a fault, such as being easy to escape from pile yarn.

[0009] Although the heat-retaining-property swimming suit which carried out sewing of the ground which stuck knitting fabric on both sides of a urethane foam rubber sheet as another technique is also sold, the ground of heat retaining property of a certain thing is thick, stretchable is inferior in it, since eyes are also large, it bars maneuverability, and this swimming suit has the problem that cost also becomes high.

[0010]

[Problem(s) to be Solved by the Invention] The actual condition is that the swimming suit which consists of knitting fabric excellent in the cold

sense mitigation nature which a wearer senses is comfortable is not obtained, having stretchable [which is demanded as a swimming suit], eyes, and water omission nature for these various troubles.

[0011] This invention uses as an offer plug the swimming suit by stretchable [of the ground needed for a swimming suit], and the water wear knitting fabric and it which also satisfy aesthetics further by low cost while it mitigates the cold sense of the body after going up from a pool etc. in view of the fault of the swimming suit which consists of knitting fabric which consists of this Prior art and reduces a wearer's displeasure.

[0012]

[The means for solving invention] The following means are used for this invention in order to solve this technical problem. That is, the water wear knitting fabric of this invention has the concave heights in which the section edited by the rear face has the difference of elevation 0.2mm or more 2.0mm or less, and while the maximum of the width of face of these heights is 0.6mm or more 2.2mm or less, in the whole rear-face surface product ratio, these heights occupy 35% or more, and it gets wet, and it is the knitting fabric which makes synthetic-fiber multifilament a subject, and it is characterized by the water retention value on the rear face of knitting fabric at the time being 30% or less. Moreover, the swimming suit of this invention is characterized by consisting of this water wear knitting fabric.

[0013]

[The practical gestalt of invention] While this invention reduces the cold sense and displeasure of the body, about the water wear knitting fabric with which are satisfied of stretchable [of the ground needed for a swimming suit], and aesthetics If a thing [****] is used for the magnitude of the width of face of these heights of the concave heights of the section edited by the rear face, and the water retention value of the rate of occupying and this knitting fabric rear face in the whole rear-face surface product of the heights when it inquires wholeheartedly, it will study solving this technical problem at once also unexpectedly.

[0014] as synthetic-fiber multifilament which constitutes the knitting fabric of this invention, it is a polyamide system, a polyester system, and a polypropylene system line of thread, and can use by the knitting fabric edited by the intersection which used 100% of these each, or combined those multifilament lines of thread.

[0015] As a line-of-thread gestalt, although a gray yarn gestalt is sufficient, temporary Yori processing is performed, and when crimp is

given in the die-length direction of a line of thread or it is made the swimming suit by knitting fabric and it by using the polybutylene terephthalate fiber which is the high flexible yarn of a polyester system, it can obtain stretchable [desirable].

[0016] Moreover, it can obtain stretchable [which improved further] by carrying out intersection editing of the polyurethane elastic yarn to said multifilament line of thread.

[0017] As a gestalt of the yarn of the synthetic fiber which constitutes knitting fabric, it is not a monofilament, and multifilament is used. In the case of a monofilament, the touch is bad, and it is inferior to a feeling of wear in it.

[0018] As the number of filaments of multifilament, five to 100 filament is desirable and 0.5-10 deniers is desirable as single fiber fineness. Moreover, especially the cross-section configuration of a single fiber is not limited, but can use a round-head cross section, a triangular cross section, other variant cross sections, etc. Moreover, it can be preferably used from 20 deniers to about 150 deniers, without also limiting especially the size of yarn.

[0019] As a class of knitting fabric, both the single round-braid ground which is a round-braid ground the double round-braid ground the tricot ground which is warp-knit material and the rales ground can be used.

[0020] The knitting fabric used by this invention has the concave heights in which **** of the rear face has the difference of elevation 0.2mm or more 2.0mm or less. Even when sewing is carried out so that the concave convex may be on a skin side, a swimming suit is created and the swimming suit itself contains water in order that the concave convex of the knitting fabric and the touch area of the skin may decrease, the layer of air is made between the concave convex of a swimming suit, and the skin, and if a feeling of smeariness mitigates and forces, the displeasure accompanying a cold sense can be mitigated. The difference of elevation of the concave convex of this knitting fabric is 0.2mm or more 2.0mm or less, and has a feeling of smeariness when a crevice also becomes easy to contact the skin and a swimming suit includes it for water in less than 0.2mm. Moreover, although there is no feeling of smeariness when 2.0mm is exceeded, heights will be too high and will be inferior to a feeling of the touch. When the difference of elevation is in these concave heights, an air space is formed in a crevice and it can wear as a swimming suit which has cold sense mitigation nature with the heat retaining property also at stages other than midsummer.

[0021] As for the knitting fabric used by this invention, the maximum of the width of face of the heights uses a thing 0.6mm or more 2.2mm or less. That is, when sewing is carried out and it carries out so that the heights may be on a skin side, and a swimming suit is formed, by specifying the width of face of heights, a contact condition with the skin can be balanced and cold sense mitigation nature can be raised more. When the maximum of the width of face of heights is less than 0.6mm, the contact of the ground and the skin increases, and since water is included in the crevice between heights, it becomes the cause whose frigidity sexualis increases. Moreover, when the maximum of the width of face of heights exceeds 2.2mm, the touch area of heights and the skin increases and the flat thing whose feeling of smeariness when a swimming suit contains water is usually elegance, and the inclination whose great difference is lost come to be shown. Regardless of the maximum of the width of face of heights, it knits in the configuration of heights here, and measures in the direction of a right angle to a direction. The configuration of these concave heights can apply broadly the shape of the shape of the shape of the shape of the shape of a length stripe, and a width border, and a grid, and a twill, herringbone state, and a dot etc., and is not limited. Similarly, a field besides knitting fabric is also applicable without limitation from the shape of a flat to concave convex.

[0022] In order to make concave convex ***** form in the rear face of knitting fabric, there is especially combination of the approach by the knitted tissue, thick yarn, and thin yarn or these both combination, and it is not limited.

[0023] By the knitting fabric of this invention, the area of the heights of the rear face of this knitting fabric uses what is more preferably occupied in 80% or less of range 35% or more 35% or more by the whole rear-face surface product ratio. When this surface ratio is less than 35%, since the crevice of a swimming suit also becomes easy to contact the skin and the touch area of the concave convex of a swimming suit skin and the skin becomes large too much, a feeling of smeariness becomes a thing inferior to increase and a feeling of wear, and gives displeasure on the contrary.

[0024] Moreover, the knitting fabric used by this invention gets wet, and the water retention value on the rear face of knitting fabric at the time uses 30% or less of thing. When this water retention value becomes low at 10% or less, it stops in addition, sensing frigidity sexualis at all by wear evaluation. When this water retention value exceeds 30%, when a

feeling of smeariness in the contact surface of heights and the skin increases comes to show the inclination used as what is inferior to increase and the wear amenity in a cold sense.

[0025]

[Example] Hereafter, an example explains this invention in more detail. In addition, the property was measured by the following approach.

[0026] The tothing-like difference of elevation of [tothing [of knitting fabric rear-face concave heights]-like difference-of-elevation] knitting fabric rear-face concave heights bends a knitting fabric concave convex in the length direction and the width direction, and is a micro watcher (MODEL US90S) by Mitsubishi Electric Corp. about the bending section. It used and the value photoed by one 50 times the scale factor of this was made into 1/50. The concavo-convex height of the length direction and the width direction was measured 10 times, respectively, and the average was made into the difference of elevation.

[0027] It is h [in / specifically / the knitting fabric cross-section structure model Fig. of drawing 1]. A value shows.

[0028] The front face of [maximum of knitting fabric rear-face heights width of face] knitting fabric concave heights was photoed by one 50 times the scale factor of this by the aforementioned micro watcher, and the width of face of heights knit the greatest part on the photograph, it measured in the direction of a right angle to the direction, and the value was made into 1/50. It measured 10 times, respectively and the average was made into the maximum of heights width of face. It is W [in / specifically / the knitting fabric cross-section structure model Fig. of drawing 1 to 5, and a knitting fabric flesh-side plane-structure model Fig.]. A value shows.

[0029] [-- the heights area to a whole rear-face surface product -- comparatively -- the micro watcher of the above [the front face of] knitting fabric concave convex] -- one 50 times the scale factor of this -- taking a photograph -- the photograph top -- heights area -- Uchida digital planimeter (KP-90) By tracing, the area of the heights to a whole surface product was measured. The rate is expressed with a percentage.

[0030] Weight of a [knitting fabric concave convex water retention value] 10cmx10cm evaluation sample (E) After measuring and being immersed in distilled water, a sample is taken out and it places by carrying out the concave convex of a sample on a glass plate downward. One sheet of 10cmx10cm blotting paper is put on the sample bottom, and it is 5 g/cm². After leaving it for 10 seconds under a load, knitting

fabric weight (E1) is measured. Then, it faces across both sides of a humid sample with a 10cmx10cm blotting paper, and is 5 g/cm². After leaving it for 60 seconds under a load, the moisture detected from the field of each front flesh side of knitting fabric is measured from the increment weight of each blotting paper put on both sides. It is F about the moisture content detected from the knitting fabric concave convex. When it carries out, it asks for knitting fabric concave convex water retention value G (%) by the degree type, and expresses with the average of three sheets.

[0031] concave convex water retention value $G(\%) = \{F/(E1-E)\} \times 100$ -- it is the evaluation approach supposing the condition that this went up from the pool etc. and the drop of a swimming suit was able to be taken, and when it wears as a swimming suit so that this concave convex water retention value G (%) is small, the cold sense of the body means a thing comfortable few.

[0032] The criteria of "the feeling of the touch" of the skin side irregularity section in [wear evaluation and comprehensive evaluation] wear, "the feeling of smeariness after going up from the water", "frigidity sexualis", and "comprehensive evaluation" are as follows.

[0033] (1) The "feeling of the touch" by the side of the skin (concave heights)

O For very good O: "the touch", good x: "the touch" is [: "the touch"]

(2). "Feeling of smeariness after going up from the water" [bad]

O (3) with a little **: "a feeling of smeariness" without : "a feeling of smeariness" which does not almost have O: "a feeling of smeariness" and which has x: "a feeling of smeariness" very much "Frigidity sexualis"

O : (4) which does not sense a cold sense, which hardly feels O:cold sense, which senses **:cold sense a little "Comprehensive evaluation" [which senses x:cold sense]

O x which is very excellent as a :cold sense mitigation nature swimming suit and which is suitable as an O:cold sense mitigation nature swimming suit : the polybutylene terephthalate fiber whose polyester filament [by example 1 Toray Industries, Inc.] "Dacron" unsuitable as a cold sense mitigation nature swimming suit is 1 A type was used, and with the single tricot machine of 28 gages, 50-denier 24 filament yarn was arranged on the front reed and the middle reed, 30-denier 12 filament yarn was arranged on the back reed, and it composed of the three-sheet reed. Consequently, the knitting fabric which has the rear-face stripe-like irregularity difference of elevation as shown in the model Fig. of drawing

2 was obtained. One side of this knitting fabric was made the flat type. [0034] then, the dyeing-and-finishing conditions of usual polyester knitting fabric -- applying correspondingly -- refinement, dyeing, and a finish set -- carrying out -- eyes -- 172 g/m² it is -- knitting fabric was obtained.

[0035] This knitting fabric is the difference of elevation h of concave heights. 0.56mm and heights width-of-face maximum w The surface ratio of 1.13mm and heights was 43.8% of thing. Moreover, the water retention value of the concave convex of the ground was 12.0%.

[0036] The swimming suit was made as an experiment so that a concave convex might be on a skin side using this knitting fabric, and eight female test subjects performed wear evaluation in an indoor pool late in June. Consequently, it was what is excellent in the wear amenity after the feeling of the touch by the concave convex difference of elevation and heights width-of-face maximum which were allotted to the background of a swimming suit is also satisfactory and a feeling of smeariness, frigidity sexualis, etc. go up from a pool satisfactory at all. These evaluation results are shown in Table 1.

[0037] Using 100% of temporary Yori finished yarn of the nylon filament (50-denier 17 filaments) by example 2 Toray Industries, Inc., it composed in the jacquard organization of double-sided round-braid machine 28 gages, and the knitting fabric which has the flesh-side plane lattice-like irregularity difference of elevation as shown in drawing 3 was obtained. One side of this knitting fabric was also made the flat type.

[0038] then, the dyeing-and-finishing conditions of usual nylon knitting fabric -- applying correspondingly -- refinement, dyeing, and finish -- carrying out -- eyes -- 154g/m² it is -- knitting fabric was obtained.

[0039] This knitting fabric is the difference of elevation h of concave heights. 0.22mm and heights width-of-face maximum w The surface ratio of 0.64mm and heights was 36.2% of thing. Moreover, the water retention value of the concave convex of the ground was 28.6%.

[0040] It was satisfactory as a result of making a swimming suit as an experiment so that a concave convex may be on a skin side like an example 1 using this knitting fabric, and carrying out real wear evaluation. An evaluation result is collectively shown in Table 1.

an example -- three -- usual -- Toray Industries -- Co., Ltd. -- make -- polyester -- a filament -- " -- Dacron -- " (50-denier 24 filaments) -- Du Pont-Toray -- Co., Ltd. -- make -- polyurethane -- elastic yarn -- " -- the operon -- " (a trademark, 40 deniers) -- using it -- the single tricot machine of 28 gages -- a three-sheet reed -- a front reed

and a middle reed -- Dacron yarn and a back reed -- operon yarn -- allotting -- having composed . The blended ratio of each line of thread was made into 40% of front reeds, 40% of middle reeds, and 20% of back reeds, and the knitting fabric which has the rear-face wave stripe-like irregularity difference of elevation as shown in drawing 5 was obtained. One side of this knitting fabric was also considered as the flat type.

[0041] Then, as a result of dyeing and finishing by performing refinement, dyeing, and a finish set according to the dyeing-and-finishing conditions of usual polyester and the knitting fabric edited by the polyurethane elastic yarn intersection, eyes are 184 g/m². Knitting fabric was obtained. This knitting fabric is the difference of elevation h of concave heights. They were 1.86mm and the thing whose area of 2.18mm and heights the heights width-of-face maximum w is 52.3%. Moreover, the water retention value of the concave convex of knitting fabric was 9.4%.

[0042] It was satisfactory, as a result of making a swimming suit as an experiment and carrying out real wear evaluation so that a concave convex may be on a skin side like an example 1 using this knitting fabric. An evaluation result is collectively shown in Table 1.

[0043] The same polyester filament [by Toray Industries, Inc.] "Dacron" as example of comparison 1 example 1 was used, and with the single tricot machine of 28 gages, 50-denier 24 filament yarn was arranged on the front reed, 30-denier 12 filament yarn was arranged on the back reed, and it composed of the two-sheet reed. Front 80%, the blended ratio of each line of thread carried out to back 20%, and acquired the ground which has front flesh-side flat structure like drawing 4 . This is a half organization usually employed as an object for swimming suits.

[0044] Then, as a result of dyeing and finishing like an example 1, eyes are 142 g/m². Knitting fabric was obtained. Moreover, this knitting fabric is the difference of elevation h of concave heights. It was 0.04mm and was what the surface ratio of heights width-of-face maximum and concave heights hardly understands clearly since it is a flat. Moreover, the rear-face water retention value of the ground was 54.0%.

[0045] Since the water retention value of a swimming suit skin was too high in order that a swimming suit and the skin may stick too much as a result of making a swimming suit as an experiment like an example 1 using this knitting fabric and carrying out real wear evaluation, it was what senses a feeling of smeariness, and a cold sense very much although there is no problem that a feeling of the touch is big, and is

inferior to a feeling of wear. This evaluation result is collectively shown in Table 1.

[0046] It composed with the same yarn usage as example of comparison 2 example 1, and the same tricot machine, and the ground which has the rear-face stripe-like irregularity difference of elevation like drawing 2 was acquired. One side of this knitting fabric was also considered as the flat type.

[0047] Then, as a result of dyeing and finishing like an example 1, eyes are 168 g/m². Knitting fabric was obtained. This knitting fabric is the difference of elevation h of concave heights. 2.45mm and heights width-of-face maximum w The surface ratio of 1.35mm and heights was 32.3% of thing, and the concave convex water retention value was 22.7%.

[0048] Although it was satisfactory with a feeling of smeariness as a result of making a swimming suit as an experiment like an example 1 using this knitting fabric and carrying out real wear evaluation, since the difference of elevation of the skin side irregularity section was too high, it was a thing inferior to a feeling of the touch. This evaluation result is collectively shown in Table 1.

[0049] The ground which has the flesh-side plane lattice-like irregularity difference of elevation like drawing 3 was acquired in the same yarn usage as example of comparison 3 example 2, and the jacquard organization of a double-sided round-braid machine.

[0050] Then, as a result of dyeing and finishing like an example 2, eyes are 164 g/m². Knitting fabric was obtained. This knitting fabric is the difference of elevation h of concave heights. 0.16mm and heights width-of-face maximum w The area of 2.39mm and heights is 40.4%, and the concave convex water retention value of the ground was 41.4%.

[0051] Although it is satisfactory with a feeling of the touch as a result of making a swimming suit as an experiment like an example 1 using this knitting fabric and carrying out real wear evaluation, since the concave heights difference of elevation and heights width-of-face maximum were too large, it was that in which the water retention value of that part is inferior to a feeling of smeariness, and frigiditas sexualis by becoming high. These results are collectively shown in Table 1.

[0052]

[Table 1]

	No.	糸使い	原糸混率 (%)	編組織	凹凸面の模様	目付 (g/m ²)	凹凸高低差 h(mm)	凸部幅最大値 w(mm)	凸部面積比 (%)	凹凸部保水率 (%)	着用評価			総合評価
											肌触り感	ベタツキ感	冷感性	
実施例	1	F)T50-24 M)T50-24 B)T30-12	40 40 20	経編 28G	ストライプ	172	0.56	1.13	43.8	12.0	◎	◎	○	◎
	2	N50-17	100	丸編 28G	格子	154	0.22	0.64	36.2	28.6	◎	○	○	○
	3	F)T50-24 M)T50-24 B)PU40	40 40 20	経編 28G	波形 ストライプ	184	1.86	2.18	52.3	9.4	○	◎	◎	◎
比較例	1	F)T50-24 B)T30-12	80 20	経編 28G	フラット	142	0.04	—	—	54.0	◎	×	×	×
	2	F)T50-24 M)T50-24 B)T30-12	40 40 20	経編 28G	ストライプ	168	2.45	1.35	32.3	22.7	×	○	○	×
	3	N50-17	100	丸編 28G	格子	164	0.16	2.39	40.4	41.4	○	△	×	×

糸使い項中、F：フロント糸、M：ミドル糸、B：バック糸

T：ポリエステル糸、N：ナイロン糸、PU：ポリウレタン糸

[0053]

[Effect of the Invention] the water wear knitting fabric which was excellent also in the practicality of the ease of moving etc. while having the outstanding wear amenity that the frigidity sexualis accompanying the feeling of smeariness after going up from the water was mitigated according to this invention, when it wore as a swimming suit -- it can provide -- the school from this knitting fabric -- service water -- arrival and fitness -- service water -- arrival and swimming -- service water -- arrival and rehabilitation -- service water -- it can be used suitable for arrival etc. and a broad swimming suit.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
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- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the cross-section structure model Fig. of the knitting fabric of this invention.

[Drawing 2] It is a knitting fabric flesh-side plane-structure model Fig. in the example 1 and the example 2 of a comparison of this invention.

[Drawing 3] It is a knitting fabric flesh-side plane-structure model Fig. in the example 2 and the example 3 of a comparison of this invention.

[Drawing 4] It is a knitting fabric flesh-side plane-structure model Fig. in the example 1 of a comparison of this invention.

[Drawing 5] It is a knitting fabric flesh-side plane-structure model Fig. in the example 3 of this invention.

[Description of Notations]

a : the line of thread which forms a knitting fabric front face

b : the line of thread which forms knitting fabric rear-face heights

c : the line of thread which forms a knitting fabric rear-face crevice

h : knitting fabric rear-face concave heights difference of elevation

w : knitting fabric rear-face heights width-of-face maximum

[Translation done.]

* NOTICES *

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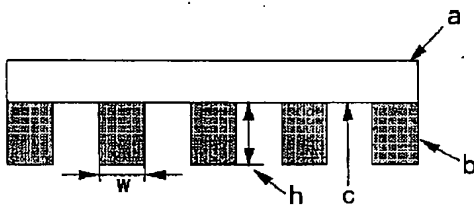
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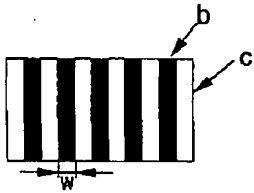
3.In the drawings, any words are not translated.

DRAWINGS

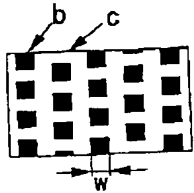
[Drawing 1]



[Drawing 2]



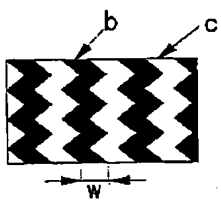
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]